

REMARKS

Claims 1-25 are all the claims currently pending in the application. Claims 4, 8-16, 20-21, and 25 are amended herein. No new matter is being added. The drawings are objected to and claims 1-17, 20-21, and 23-25 are rejected on prior art grounds. Claims 18-19 and 22 are allowed. Applicants respectfully traverse the objections/rejections based on the following discussion.

I. The Objections to the Drawings

The drawings are objected to because the Office Action indicates that Figures 27-28 should be designated by a legend such as --Prior Art--. As such, the Applicants have amended the drawings in accordance with the suggestion in the Office Action by providing, in red ink, the legend --Prior Art-- in Figures 27-28. Should the drawings be accepted by the Examiner, the Applicants shall submit formal drawings, should they be necessary, upon allowance of the application. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw this objection.

II. The Claim Rejections

Claims 4 and 7-9 stand rejected under 35 U.S.C. §102(e) as being anticipated by Kwon (U.S. Patent No. 6,486,930). Claim 20 stands rejected under 35 U.S.C. §102(e) as being anticipated by Fujiyoshi et al. (U.S. Patent No. 6,323,871), hereinafter referred to as “Fujiyoshi”. Claims 10-12-13, 16, 21, and 25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kwon. Claims 1, 6, and 14-15 stand rejected under 35 U.S.C. §103(a) as being

unpatentable over Kwon in view of Yamauchi et al. (U.S. Patent No. 6,512,504), hereinafter referred to as “Yamauchi”. Claim 5 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Kwon as applied to claim 4, and further in view of Kazuhiro et al. (Japanese Patent No. JP 05-265,045), hereinafter referred to as “Kazuhiro”. It should be noted that “Kazuhiro” is the first name of the inventor and “Takahara” is the last name, which is conventionally used as the moniker when referencing a prior art reference. However, in the interest of clarity, the Applicants shall refer to this prior art reference as “Kazuhiro” to avoid confusion with its use in the Office Action. Claims 11, 17, and 24 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kwon in view of Wong (U.S. Patent No. 6,501,453). Claims 2-3 and 23 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kwon in view of Yamauchi and further in view of Wong. Applicants respectfully traverse these rejections based on the following discussion.

Kwon teaches a liquid crystal display and a circuit for driving the same, having a higher resolution and being able to be manufactured at low cost. The liquid crystal display having first and second plates and a liquid crystal being sealed therebetween includes: a plurality of scanning lines arranged on the first plate one direction; a plurality of data lines arranged on the first plate, intersecting the scanning lines; first and second pixel regions, located at both sides of each data line, respectively; a first switch for selectively transmitting a video signal loaded on a corresponding data line to the first pixel region; and a second switch for selectively transmitting the video signal loaded on the data line to the second pixel region.

Fujiyoshi teaches a matrix-addressed liquid crystal display device, and its driving method in which pixels to display one color by combining a plurality of basic colors are arranged, the

power consumption in a drive circuit system is reduced, and no degradation of the image quality is generated, is characterized by comprising a signal input means N, wherein a large number of pixels are matrix-addressed by a large number of scanning lines G and a large number of signal lines S, combination of a plurality of basic colors are repeatedly arranged along the direction of each signal line, the number of the scanning lines is the number of all pixels arranged along the signal lines, the order of the basic colors arranged along the signal lines is repeatedly the same number along the signal lines, the same basic colors are arranged along the scanning lines, and the signal to be transmitted to each signal line for each scanning line is successively transmitted to a source driver from the source driver Sd.

Yamauchi teaches an EL display having high operating performance and reliability is provided. LDD regions of a switching TFT formed in a pixel are formed such that they do not overlap gate electrodes to provide a structure which is primarily intended for the reduction of an off-current. An LDD region of a current control TFT is formed such that it partially overlaps a gate electrode to provide a structure which is primarily intended for the prevention of hot carrier injection and the reduction of an off-current. Appropriate TFT structures are thus provided depending on required functions to improve operational performance and reliability.

Kazuhiro teaches an active matrix type liquid crystal display device consisting of arraying $M \times N$ (M and N are optional positive integers) picture element electrodes as a matrix consisting of $2N$ scanning lines each of which allocates two lines to one scanning direction display line, $M/2$ data lines, wherein the first TFT gates of each are connected to an optional data line and one scanning line in each display line, and second TFT gates of each are connected to the data line and the other scanning line.

Wong teaches a driving method for a liquid-crystal-display (LCD) which is driven by a plurality of switching transistors positioned in a matrix. The drain of each switching transistor couples to a first scanning signal via a storage capacitor and to a pixel electrode. The gate and the source of each switching transistor respectively couples to a second scanning signal and a video signal. One step of the driving method is shifting the video signal to have a dc voltage of a first predetermined voltage. Another step of the driving method is adding a second predetermined voltage to the pixel electrode after the second scanning signal changes the state of the switching transistor from turned-on to turn-off.

However, as amended, the claimed invention teaches away from the prior art of record. First, with regard to the rejections based on Kwon, in the claimed invention, each pixel TFT (M1, M3, etc.) connected to each pixel is connected directly to the signal line. Accordingly, unlike Kwon, it is unnecessary to design the TFT to be large-sized. With this configuration, an aperture ratio of the pixels can be increased. This is a significant advantage from the viewpoint of extendibility to higher resolution displays and of quality of displays.

Moreover, as to the claimed invention, one of the scanning lines adjacent to the pixel is not associated with the addressing of the pixel. Accordingly, unlike Kwon, a storage capacitor can be arranged in the claimed invention between the pixel electrode and one of the scanning lines adjacent to the pixel. The claimed invention's storage capacitor is advantageous for liquid crystal display products. However, Kwon does not mention anything regarding the storage capacitor, and regarding an advantage of addressing by two scan lines disposed at one side of the pixel. As previously mentioned, the configuration provided by the claimed invention results in an increase in the aperture ratio of the pixels.

As to claimed invention, different pixels arranged in row and column alternately as provided in amended claim 4, whereas Kwon does not teach or suggest this arrangement. Furthermore, in the claimed invention, a longer gate pulse turns on again before changing signal line voltage (as demonstrated in Figures 19 and 26, and the accompanying descriptions thereof in the present application). Again, these are features absent from Kwon.

With regard to Fujiyoshi, in the claimed invention, three pixel electrodes are connected to one signal line and are arrayed on the same display line in parallel with the scanning lines (as shown in Figure 10 of the present application). This feature is not taught or suggested in Fujiyoshi. With regard to Yamauchi, in the claimed invention, one of source/drain of one TFT is connected to the gate of another TFT and is connected to one scan line. Conversely, in Yamauchi, one of source/drain of one TFT is connected to the gate of another TFT and is connected to one source line that supplies electric potentials corresponding to video signals. Again, these are patentably distinct features of the claimed invention compared to Yamauchi.

Furthermore, as to the claimed invention, one of source/drain of one TFT is connected to a pixel and is connected to one signal line that supplies electric potentials corresponding to video signals. Conversely, in Yamauchi, one source/drain of one of the TFT is connected to the pixel and is connected to one current supply line. In fact, Yamauchi requires a current control of the TFT for displaying gray scales, whereas the claimed invention needs only ON and OFF of the TFT for addressing. Additionally, Yamauchi does not teach or suggest time divided addressing (i.e., multiplexing) that is clearly provided in the claimed invention.

With regard to Wong, in the claimed invention, at least two scan lines are provided for a time divided addressing (i.e., multiplexing). Conversely, in Wong, it is not required to have two

scanning lines. In the claimed invention, since the number of signal lines becomes at least one half of the conventional number of signal lines, there is a room on the circuit to form a connection line between two TFTs from a separate scan line without increasing the circuit size. This is a significant advantage of the claimed invention.

As amended, claim 4 teaches away from Kwon by including the elements, “first and second pixel electrodes having different electrical characteristics from one another, wherein said first and second pixel electrodes are arranged in a checked pattern so as to interpose said signal line therebetween;...” The advantages of the arrangement provided by claim 4 and as described in the application are (1) increasing aperture ratio of pixels, and (2) enhancement of an image quality. These are features absent in Kwon.

As to claim 7, Kwon does not show the configuration described in the claimed invention. Specifically, in Kwon, the first switching element connected to the signal line is not directly connected to the first pixel electrode in contrast to the conclusion reached in the Office Action. With the direct connection provided in the claimed invention, it is unnecessary to design the TFT to be large-sized in contrast to Kwon. Again, this is a significant advantage from the viewpoint of extendibility to higher resolution displays and of quality of displays.

As to claim 9, Kwon does not show the configuration described in the claimed invention. Specifically, Kwon does not teach an image display device comprising a first switching element connected to a signal line; a second switching element connected to the first switching element; a third switching element connected to a signal line; a first scanning line for supplying a scanning signal to the second and third switching elements; a second scanning line for supplying a scanning signal to the first and fourth switching element; and a fourth switching element

connected to the third switching element. In fact, Kwon does not operate in the above-described configuration provided by the claimed invention. Moreover, a driving waveform for the above configuration provided by the claimed invention is also different from those provided in the other prior art of record. As shown in Figure 26 of the present application, a longer gate pulse turns on again before changing a signal line voltage. This is different from the prior art.

As amended, claim 20 contains features not taught by Fujiyoshi. Specifically, claim 20 includes the elements, "first, second and third pixel electrodes connected to a same signal line and arrayed on the same display line in parallel with said scanning line, the first, second and third pixel electrodes being supplied with display signals from a specified signal line,...". This is not taught or suggested in Fujiyoshi.

With respect to claim 10, one of the scanning lines adjacent to the pixel is not associated with the addressing of the pixel. Accordingly, unlike Kwon, a storage capacitor can be arranged between the pixel electrode and one of the scanning lines adjacent to the pixel. Again, with this configuration, an aperture ratio of the pixels can be increased. Moreover, as previously mentioned, the storage capacitor is an advantageous aspect of the claimed invention. However, Kwon does not teach or suggest incorporating a storage capacitor, and does not teach addressing two scanning lines disposed at one side of the pixel.

As amended, claims 12, 13, 16, and 25 contain features not taught or suggested in Kwon. Specifically, claim 12 now depends on claim 11, and as such contains all the limitations provided therein, and claims 13, 16, and 25 include a storage capacitor, which is not taught or suggested in Kwon. Moreover, it would be unobvious to include a storage capacitor in Kwon because there is no suggestion in Kwon that such a feature would provide advantageous results

therein.

With regard to claim 1, in the claimed invention, there is a first switching element having a gate electrode for controlling supply of display signals and a second switching element disposed between the gate electrode of the first switching element and specified one of scanning lines. However, Kwon does not teach or suggest the above configuration. In fact, the configuration provided by the claimed invention enables the single source-to-drain connection (i.e., direct connection) such that each pixel TFT (M1, M3, etc.) connected to each pixel is connected directly to the signal line. Accordingly, unlike Kwon, it is unnecessary to design the TFT to be large-sized. Again, with this configuration provided by the claimed invention, an aperture ratio of the pixels can be increased. As mentioned, this is a significant advantage from the viewpoint of extendibility to higher resolution displays and of quality of displays.

While Yamauchi teaches current control of one TFT by connecting the source/drain of the second TFT to the gate of the first TFT, it still lacks the features provided by the claimed invention, even if combined with Kwon. Specifically, in the claimed invention, one of the source/drains of one TFT is connected to the gate of another TFT and is connected to one scan line. On the other hand, in Yamauchi, one of source/drain of one TFT is connected to the gate of another TFT and is connected to one source line that supplies electric potentials corresponding to video signals.

Furthermore, in the claimed invention, one source/drain of one TFT is connected to a pixel and is connected to one signal line that supplies electric potentials corresponding to video signals. Conversely, in Yamauchi patent, one source/drain of one TFT is connected to a pixel and is connected to one current supply line.

As mentioned, Yamauchi requires a current control of TFT for displaying gray scales. However, the claimed invention needs only ON and OFF of the TFT for addressing. In addition, Yamauchi does not teach or suggest time divided addressing (i.e., multiplexing) that is provided by the claimed invention. In fact, the above configuration of the claimed invention has a close relationship with the multiplexing, thereby allowing the claimed invention to achieve advantages unattainable by the prior art.

With regard to claim 6, the Applicants traverse the conclusion reached in the Office Action that the elements provided in claim 6 are taught by Kwon in combination with Yamauchi. Clearly, Kwon does not teach all of the elements of claim 6, as is admitted in the Office Action. However, Yamauchi does not teach the elements of claim 6 either. Thus, even if Yamauchi were combined with Kwon, they would still fail to teach all of the elements of claim 6. Specifically, Yamauchi does not teach a third scanning line provided at the front stage of first and second pixel electrode, and a storage capacitor formed between third scanning line and each of first and second electrodes. As such, the claimed invention is patentably distinct from Kwon in combination with Yamauchi.

With regard to claim 5, the Applicants traverse the conclusion reached in the Office Action that the elements provided in claim 5 are taught by Kwon in combination with Kazuhiro. Clearly, Kwon does not teach all of the elements of claim 5, as is admitted in the Office Action. However, Kazuhiro does not teach the elements of claim 5 either. Thus, even if Kazuhiro were combined with Kwon, they would still fail to teach all of the elements of claim 5. Specifically, Kazuhiro teaches the same configuration as Kwon (see Figure 4 in Kazuhiro and Figure 28 (Prior Art) in the present application). However, Kazuhiro does not teach arranging the scanning lines

at the rear stage of the pixels.

Insofar as references may be combined to teach a particular invention, and the proposed combination of Kwon with Yamauchi, Kwon with Kazuhiro, and Kwon with Yamauchi and with Wong, case law establishes that, before any prior-art references may be validly combined for use in a prior-art 35 U.S.C. § 103(a) rejection, the individual references themselves or corresponding prior art must suggest that they be combined.

For example, in In re Sernaker, 217 U.S.P.Q. 1, 6 (C.A.F.C. 1983), the court stated: “[P]rior art references in combination do not make an invention obvious unless something in the prior art references would suggest the advantage to be derived from combining their teachings.” Furthermore, the court in Uniroyal, Inc. v. Rudkin-Wiley Corp., 5 U.S.P.Q.2d 1434 (C.A.F.C. 1988), stated, “[w]here prior-art references require selective combination by the court to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself. . . . Something in the prior art must suggest the desirability and thus the obviousness of making the combination.”

In the present application, the reason given to support the proposed combination is improper, and is not sufficient to selectively and gratuitously substitute parts of one reference for a part of another reference in order to try to meet, but failing nonetheless, the Applicant’s novel claimed invention. Furthermore, the claimed invention, as amended, meets the above-cited tests for obviousness by including embodiments such as providing a storage capacitor and arranging the pixel electrodes in a checked pattern, among others. As such, all of the claims of this application are, therefore, clearly in condition for allowance, and it is respectfully requested that the Examiner pass these claims to allowance and issue.

As declared by the Federal Circuit:

In proceedings before the U.S. Patent and Trademark Office, the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art. The Examiner can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. In re Fritch, 23 U.S.P.Q.2d 1780, 1783 (Fed. Cir. 1992) citing In re Fine, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988).

Here, the Examiner has not met the burden of establishing a prima facie case of obviousness. It is clear that, not only does Kwon individually fail to disclose all of the elements of the claims of the present invention, particularly, the storage capacitor as discussed above, but also, if combined with Yamauchi, Kazuhiro, and Wong, respectively, fails to disclose these elements as well. The unique elements of the claimed invention are clearly an advance over the prior art.

The Federal Circuit also went on to state:

The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. . . . Here the Examiner relied upon hindsight to arrive at the determination of obviousness. It is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. Fritch at 1784-85, citing In re Gordon, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984).

Here, there is no suggestion that Kwon, alone or in combination with Yamauchi, Kazuhiro, and Wong teaches an apparatus containing all of the limitations of the claimed invention. Consequently, there is absent the "suggestion" or "objective teaching" that would have to be made before there could be established the legally requisite "prima facie case of

obviousness."

Additionally, the claimed invention has already been implemented into commercially successful products. Thus, the novel configuration of the Applicants' claimed invention is a clear distinction from the prior art of record, and as such in view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw these rejections.

III. Formal Matters and Conclusion

With respect to the rejections to the claims, the claims have been amended, above, to overcome these rejections. Moreover, the Applicants respectfully submit that independent claims 1, 4, 10, 13-14, 16, 18, and 20-25 are patentable over the prior art of record. Furthermore, dependent claims 2-3, 5-9, 11-12, 15, 17, and 19 are similarly patentable, not only by virtue of their dependency from a patentable independent claim, but also by virtue of the additional features of the invention they define.

In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections to the claims. Applicants submit that claims 1-25, all the claims presently pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary. Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 50-0510.

Respectfully submitted,

Dated: April 15, 2004



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